microfluidic channels **285** in microfluidic component **201** of microfluidic cartridge **200**. Each solid element of array **501** is a conductive element of a heater wafer and is connected, directly or indirectly, to external control circuitry that controls which conductive elements receive current at a particular time. The heater wafer in which heater array **501** is situated is preferably disposed in thermal communication with, such as in contact with, microfluidic component **201**. Heater array **501** can be fabricated using design and manufacturing techniques familiar to one of ordinary skill in the art, such as described in PCT/US2005/015345, and U.S. provisional application Nos. 60/567,174, and 60/645,784, all of which are incorporated herein by reference in their entirety.

[0093] Heater array **501** can preferably be configured so that individual cartridges or lanes of multi-sample cartridge **200** are heated separately and independently of one another. In other embodiments, heater array **501** is configured so that cartridges or lanes are heated in pairs or in groups, such as 4 lanes at a time in an 8-lane cartridge.

[0094] FIG. **8** shows an expanded view of a part of heater array **501** overlayed upon a part of microfluidic network **201**. As can be seen in FIG. **8**, different parts of heater array **501** have different thicknesses. According to the principle of resistive heating, the thinner parts of array **501** will become the hottest for a given current. Elements such as **505** are current carriers that serve as spacers across regions of microfluidic component **201** that have no microfluidic elements requiring heating. Elements such as **505** thereby generate the least amount of heat of all elements of array **501**. Elements **503** achieve an intermediate heating, and are typically of thickness 300 μm, though may range from 280-320 μm, and may also range from 250-350 μm. Elements **507** and **509** achieve the most heating and are disposed directly adjacent microfluidic components such as gates, and valves. Elements **507** and **509** are shown in further detail in FIG. **9**.

[0095] FIG. **9** shows a further expanded view of a region of FIG. **8**, showing structures of elements **507**. These structures have fine-scale resistive heaters that generate the greatest amount of heat per unit length of heater array element. The thickness of the wires is typically 40-120 μm, and preferably 50-100 μm, more preferably 60-90 μm, and even more preferably 70-80 μm.

Microfluidic Component

[0096] As shown in FIG. **10**, microfluidic component **201** typically comprises a number of channels such as channel **234** that are configured to transmit volumes of fluid in the range 0.1-50 μl. Component **201** also preferably comprises one or more microfluidic elements selected from the group consisting of: at least one valve or actuator, at least one gate, at least one hole, at least one vent, at least one filter, and at least one waste chamber. Various configurations of such microfluidic elements are consistent with a microfluidic network that is suitable for practicing methods described herein, and the embodiment shown in FIG. **10** is not intended to be limiting. Accordingly, it would be understood by one of ordinary skill in the art that the configuration of microfluidic elements in FIG. **10** is but one configuration that can be established for practicing the present invention and that other variations of the same are within the scope of the instant invention, although not explicitly found within the instant description. For example, an alternative configuration of microfluidic component is shown in FIG. **2** and described in accompanying text of U.S. provisional application Ser. No. 60/726,066, filed Oct. 11, 2005 and incorporated herein by reference.

[0097] FIG. **10** shows a plan view of component **201**, in which various microfluidic elements are labeled as follows: valve (Vi), gate (Gi), hole (Hi), vent (V), and filter (C.), wherein i denotes an integer in the case that there is more than one instance of a particular type of element. In FIG. **10**, as with others of FIGS. **15-27**, some portions of the microfluidic circuitry are too fine-scale to show up, and gaps are apparent. The exemplary structure that fills such gaps becomes apparent from viewing various panel views in, e.g., FIGS. **21**, **22**, and **24**. The relationship between component **201** and cartridge **200** is at least as follows. Sample inlet **282** is positioned above, though not necessarily directly above, and in communication with hole H**2**. Reagent inlet **280** is positioned above and in communication with hole H**1**. Outlet **270** is positioned above and in communication with hole H**4**. Outlet **236** is positioned above and in communication with hole H**3**.

[0098] Various elements of microfluidic component **201** are substantially defined between layers **207** and **205** but are configured to communicate with layer **209** where applicable.

[0099] A channel **204** extends between hole H**1** and a gate G**5**, via gate G**4**. Channel **206** extends between gate G**5** and valve V**4**. Channels **208** and **211** extend between hole H**1** and gate G**5**, which is also connected to channel **206**. Channels **208** and **211** are separated from one another by gate G**3** and valve V**3**. Gate G**2** lies on channel **208**.

[0100] Channel **213** extends from gate G**5** to junction **259**. Channel **239** extends from junction **259** to filter C. Filter is typically a bead column.

[0101] Channel **210** extends from filter C. to junction **215**. Gate G**6** separates junction **215** from mixing channel **212**. Mixing channel **212** extends from gate G**6** to hole H**3**. Thus, in combination, channels **210** and **212** permit filtered sample to travel to hole H**3**, and thus through a hole **236** via a nozzle **284** such as in FIG. **6** into a PCR tube (not shown). Mixing channel **212** has a capacity to hold between 10 and 50 μl of sample, and can be configured to hold a particular volume within that range by altering the number of turns in the channel.

[0102] Channel **234** extends in one direction from hole H**2**, to junction **259**, via valve V**1**, and in the other direction from hole H**2**, via gate G**2**, to hole H**4**.

[0103] Channel **236** extends from junction **257** to junction **215**, separated by valve V**2** and gate G**1**.

[0104] Various elements of microfluidic component **201** are now described, in turn.

Filtration Element

[0105] FIG. **11** shows a filtration element **250**, such as a bead capture filter or a bead column, for use with a microfluidic component as described herein. Referring to FIG. **3**, layers **205**, **207**, and **209** of microfluidic component **201** are shown. Filtration element **250** retains a plurality of particles **218** (e.g., beads, DNA capture beads, or microparticles such as microspheres) configured to retain polynucleotides of the